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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/740,760	11/29/2000	Allen R. Davis	CC-0308	4311

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TERRIL G. LEWIS
HOWREY SIMON ARNOLD & WHITE, LLP
750 BERING DRIVE
HOUSTON, TX 77057-2198

EXAMINER
WANG, GEORGE Y

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/740,760	DAVIS ET AL.	
	Examiner	Art Unit	
	George Y. Wang	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *25-30,32-37 and 39-66* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *25-30,32-37 and 39-66* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 November 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 25 March 2003 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 47 is rejected under 35 U.S.C. 102(b) as being anticipated by Jewell et al. (U.S. Patent No. 5,367,911, from hereinafter "Jewell").

Jewell discloses an apparatus for sensing flow within a pipe (fig. 4, ref. 42) using acoustic sensing device for providing an acoustic signal indicative of the speed of sound in the fluid flowing within the pipe (col. 12, lines 17-28) and a flow velocity sensing device (fig. 5-8, ref. 108, 112) coupled to the acoustic device for providing a velocity signal indicative of the speed of the fluid flowing within the pipe (col. 9, lines 1-15).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 25-26, 30-48, and 52-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berthold et al. (U.S. Patent No. 5,845,033, from hereinafter "Berthold") in view of Kluth (U.S. Patent No. 5,804,713).

6. As to claim 25, Berthold discloses an apparatus for sensing flow within a pipe (fig. 1, ref. 10) using a flow velocity sensing device (fig. 1, ref. A) attached to the outside

wall of the pipe to provide a velocity signal indicative of local pressure variations within the pipe.

However, the reference fails to specifically disclose an acoustic sensing device attached to the outside wall of the pipe to provide a signal indicative of the acoustic pressure variations within the pipe.

Kluth discloses an acoustic sensing device attached to the outside wall of the pipe to provide a signal indicative of the acoustic pressure variations within the pipe (col. 4, lines 44-57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have also included an acoustic sensing device attached to the outside wall of the pipe to provide a signal indicative of the acoustic pressure variations within the pipe since one would be motivated by applications that include sand detection, pump, monitoring, and fluid monitoring (col. 4, lines 44-57). Furthermore, acoustic sensors are well known in the art and benefit from very high bandwidth while having low sensitivity, which make for highly efficient detection (col. 4, lines 44-57).

7. As to claim 31, 38, and 47, Berthold discloses an apparatus for sensing flow within a pipe (fig. 1, ref. 10) using a flow velocity sensing device (fig. 1, ref. A) attached to the outside wall of the pipe to provide a velocity signal indicative of local pressure variations within the pipe.

However, the reference fails to specifically disclose an acoustic sensing device attached to the outside wall of the pipe to provide a signal indicative of speed of sound within the pipe.

Kluth discloses an acoustic sensing device attached to the outside wall of the pipe to provide a signal indicative of the speed of sound within the pipe (col. 4, lines 44-57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have also included an acoustic sensing device attached to the outside wall of the pipe to provide a signal indicative of the speed of sound within the pipe since one would be motivated by applications that include sand detection, pump, monitoring, and fluid monitoring (col. 4, lines 44-57). Furthermore, acoustic sensors are well known in the art and benefit from very high bandwidth while having low sensitivity, which make for highly efficient detection (col. 4, lines 44-57).

8. As to claims 26 and 48, Berthold discloses the apparatus as recited above with an optical source optically connected to provide optical power to the sensors (fig. 1, ref. 18).

9. Regarding claims 30, 32-37, 39-46 and 52-66, Berthold discloses the apparatus as recited above with fluid velocity sensors comprises a plurality of sensors (fig. 1, ref. A, B, C), which are evenly spaced (fig. 1, ref. “gauge length”) to sense the fluid flow

(abstract), made up of optical fiber sensor that coil around the pipe (fig. 8), and separated by Bragg gratings (abstract).

However, the reference fails to specifically disclose an acoustic sensing device comprising a plurality of sensors, which are evenly spaced to sense the speed of sound, made up of optical fiber sensor that coil around the pipe, and separated by Bragg gratings.

Kluth discloses an acoustic sensing device comprising a plurality of sensors (fig. 3, ref. 2), which are evenly spaced to sense the speed of sound, made up of optical fiber sensors that coil (fig. 3, ref. 35) around the pipe.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate an acoustic sensing device comprising a plurality of sensors, which are evenly spaced to sense the speed of sound, made up of optical fiber sensor that coil around the pipe, and separated by Bragg gratings since one would be motivated by applications that include sand detection, pump, monitoring, and fluid monitoring (col. 4, lines 44-57). Moreover, acoustic sensors are well known in the art and benefit from very high bandwidth while having low sensitivity, which make for highly efficient detection (col. 4, lines 44-57). In addition, Bragg gratings are well known in the art and one of ordinary skill in the art would recognize its benefits in acoustic sensors and optical multiplexing as well (Berthold, *abstract*), especially in sensing shifts in wavelengths.

10. Claims 27-29 and 49-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berthold and Kluth, and in further view of Layton et al. (U.S. Patent No. 5,363,342, from hereinafter "Layton").

Berthold and Kluth disclose the apparatus as recited above, however, the references fail to specifically disclose a housing, which encloses the sensing arrays and forms a pressure vessel having an annular region between housing and pipe.

Layton discloses a housing, which encloses the sensing arrays and forms a pressure vessel having an annular region between housing and pipe (fig. 3, ref. 34).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a housing, which encloses the sensing arrays and forms a pressure vessel having an annular region between housing and pipe since one would be motivated to not only protect the sensor coils around the pipe, but to also increase the framework for which the sensors operate (col. 4, lines 33-45). Furthermore, a housing support forms an air gap (fig. 46b) around the pipe, such that the scale factor of acoustic sensitivity would increase (col. 6, lines 51-60) and provide greater compliance to detect acoustic and pressure variations and impedance mismatches (col. 5, lines 6-17).

Response to Arguments

11. Applicant's response filed 25 March 2003 have been considered but are not persuasive.

Applicant argues that the Berthold and Kluth references fail to disclose "two separate" coupled devices for providing signals (pg. 5, lines 13). However, Examiner notes that nowhere in the Applicant's claims, particularly in claims 2 and 47, is this distinction made in the claim language – that there are "two separate" coupled sensor devices. Furthermore, Applicant goes on to argue it unfeasible to produce the claimed signals (pg. 6, line 3). Although Applicant goes to great length to describe the inventions of Berthold and Kluth and what the inventions cannot do, Applicant fails to provide an substantial evidence for these claims. For example, Applicant merely suggests that Berthold's sensors, being spaced far apart, are insufficient and that Kluth's design is incapable of generating the type of signals claimed. But because these allegations are unsubstantiated, Examiner asserts to the validity of the references and maintains rejection.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Y. Wang whose telephone number is 703-305-7242. The examiner can normally be reached on M-F, 8 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on 703-305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

gw
April 21, 2003

ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800